

METABOLIC AND BODY SHAPE CHANGES

Bone Health

Bone is a living and growing tissue that is constantly being built and broken down. Bones make up the skeleton, which supports the structure of the body, protects organs, and stores the minerals calcium and phosphorous. Calcium and phosphorous are released from bone and involved in essential functions that include blood clotting, nerve transmission, and the movement of fluid in and out of cells. The body must have enough calcium and phosphorous from the diet to perform these functions. If it doesn't have enough, bone will be broken down to get it!

Bone grows in length and density during childhood and reaches maximum length during adolescence (16–20 years). Bone reaches its peak density between

the ages of 20 to 30. After that age, more bone is broken down than is built—bone becomes lighter and more brittle. It is important to build strong bones before the age of 30. After age 30 it is important to minimize bone loss. Two bone disorders, osteopenia and osteoporosis, have become a new problem for people living with HIV. Osteopenia is when there is a loss of bone mass and bone density. Osteoporosis is the diagnosed condition when there is a more severe loss of bone mass and bone density, resulting in weak and brittle bones that are more likely to break. It is unclear if this increase in osteoporosis for people living with HIV is caused by HIV or by the medications used to treat HIV.

Good Sources of Calcium and Phosphorous

Food Sources	Serving Size	Mg of Calcium	Mg of Phosphorous
Milk (whole, 2%,1%)	1 cup	300	232
Skim Milk	1 cup	350	240
Yogurt, plain	1 cup	488	385
Cheese, Cheddar	1 ounce or 1 slice	202	145
Cheese, Mozzarella	1 ounce or 1 slice	185	131
Cheese, Swiss	1 ounce or 1 slice	272	161
Broccoli, frozen, cooked	1 cup	94	90
Kale, frozen, cooked	1 cup	179	36
Fortified Orange Juice	1 cup	300	40
Fortified Soy drink	1 cup	180	120
Canned sardines with bones	3 oz	325	417
Cornflakes	1 1/3 cup	237	20
Corn Tortillas	1 medium	42	75
Tofu (check labels as calcium content varies)	1/2 cup	130-260	185

Dietary Reference Intake (DRI) for Calcium:

Age in years:	9-18	19-50	51-70	Over 71
Calcium:	1300 mg	1000 mg	1200 mg	1200 mg

Bone Health *continued*

Dietary Reference Intake (DRI) for Phosphorous

Age in years:	9-18	19-50	51-70	Over 71
	1,250 mg	700 mg	700 mg	700 mg

Vitamin D is important because it's the key that unlocks the door and allows the calcium you eat from foods and supplements to be absorbed into your bloodstream. In addition to getting Vitamin D from foods, it is made in the skin from sunlight exposure. Depending upon the time of year and where you live, about 10-15 minutes in the sun with your hands,

arms, and face exposed 2-3 times a week helps meet your body's requirements for Vitamin D. Vitamin D can also be found in dairy products, egg yolks, fatty fish, fish liver oil, and fortified breads and cereals. See the table below for examples of Vitamin D rich foods and compare it to the dietary reference intake (DRI) recommended for Vitamin D.

Good Sources of Vitamin D

Food Sources	Serving Size	IU of Vitamin D
Milk (1%)	1 cup	97.6
Egg yolk	1 large	24
Fish liver oil	1 tablespoon	1360

Dietary Reference Intake (DRI) for Vitamin D

Age in years:	9-18	19-50	51-70	Over 71
	200 IU	200 IU	400 IU	600 IU

Physical Activity is another necessary factor in bone health. Bones become stronger the more you use them, just like muscles. Weight-bearing and resistance exercise can help to:

- Achieve peak bone mass in children and adolescents
- Help to maintain or slightly increase bone density in adulthood
- Help to minimize age related bone loss in older adults

Weight-bearing activities are those in which bones and muscle work against gravity. These include running, dancing, soccer, and volleyball. Swimming and bike riding are not weight-bearing activities (although they are aerobic). For older adults, activities such as intense walking or low impact aerobics are fine. Resistance exercise, such as weight lifting, is another type of activity that strengthens both muscle and bones. It is important to keep an active lifestyle with a variety of activities to have healthy bones.

Alcohol and smoking, in general, negatively affect bone health. In men and pre-menopausal women, alcohol affects certain hormones that cause calcium to be

withdrawn from the bone and over time this can lead to a large loss in calcium from the bone. Alcoholics often have weak bones, tend to lose their balance, have trouble walking, and therefore are more likely to fall and break a hip. Smokers, more than non-smokers, have lower bone density and need to be concerned about their bone health. In post-menopausal women, moderate consumption of alcohol may have a positive affect of increasing bone density by increasing the conversion of testosterone into estradiol, a hormone that prevents bone loss.

To keep your bones healthy:

- Eat foods rich in Calcium, Vitamin D and Phosphorous everyday.
- Talk with your doctor about a supplement if you are not getting enough from food.
- Be physically active, and include weight-bearing and resistance exercises
- Do not smoke.
- Do not drink alcohol.